Remarks/Arguments

With reference to the Office Action of March 8, 2006 Applicants offer the following remarks.

Art Rejections

In the Office Action of March 8, 2006, Claim 1 was rejected under 35 USC §102(b) as anticipated by US 6,076,088 to Paik, citing column 12, lines 30-35[1], column 29, lines 10-20[2], column 12, line 65 to column 13, line 4[3], and Figure 7.

Claims 2-19 were rejected under US 6,076,088 to Paik taken with one of both of US 6,675,159 to Lin et al. and US 6,327,586 to Kisiel.

The Art of Record

US Patent 6,076,088 to Paik et al for <u>Information Extraction System And Method Using Concept Relation Concept (CRC) Triples</u> describes an information extraction system that allows users to ask questions about documents in a database, and responds to the user queries by returning possibly relevant information which is extracted from the documents. Paik's system is disclosed to be domain-independent, and to automatically build its own subject knowledge base. The system is said to be applicable to any new

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[1] 2.8 Concept Identifier

Concept Identifier 165 scans text from left to right to determine the boundaries between unique concepts. It searches for the longest phrase possible. Phrases are defined as one or more non-predicating adjectives or nouns preceding a noun. Each identified phrase becomes a candidate for a concept. Phrasal verbs are defined as one or more adverbs or prepositions following a verb. Each phrasal verb becomes a candidate for a concept. Proper names, which are identified in Proper Name Interpreter 160, and Numeric Concepts, which are identified in Numeric Concept Interpreter 150, are also considered as concepts. All open class words (e.g., nouns, verbs, adjectives, adverbs) which are not a part of the above identified candidate concepts or concepts are also considered as concepts.

[2] 9.3, Table 3, Conceptual Language Definitions (KR Guidelines)

[3] Conceptual Hierarchy database 117 maps related words and terms (synonyms) into a single concept cluster. The database differentiates between phrases as concept units and single term concepts. The concepts are organized as a hierarchical set of relations in the database. The Conceptual Hierarchy database is constructed from raw text sources, and augmented by such existing products such as WORDNET (Miller, 1995) or other thesauri.

body of text with quick results, and with no requirement for lengthy manual input. For this reason, it is also a dynamic system which can acquire new knowledge and add it to the knowledge base immediately by automatically identifying new names, events, or concepts.

Paik's method and system start by defining a set of concept categories, and then defining a set of monadic relations associated with single concepts, sets of dyadic relations between concepts, and sets of rules that allow extraction of monadic relations associated with the concepts and the dyadic relations between concepts. The target documents are then parsed to identify concepts with concept-relation-concept triples (CRC's), and relation-concept pairs (RC's) identified, extracted, and , referred to as RCs from the parsed documents; and incorporated into the data organization.

US Patent 6,327,586 to Kisiel for <u>System Method And Computer Program Product To Automate The Management And Analysis Of Heterogeneous Data</u> describes a system, method and computer program product for automating the collection, management and analysis of data. Research is performed according to a methodology based on four phases:

(1)   Requirements;

(2)   Collection;

(3)   Analysis; and

(4)   Reporting.

During the Requirements phase, users record objectives for the research project and items of interest in a Personal Dictionary. The items of interest are organized according to user defined or pre-defined categories. Data entered by the user during the Requirements phase is also used to automatically conduct database searches to compile information for the research project.

During the Collection phase relevant data items are filtered and stored in a repository. Data files are automatically searched for items of interest from the Personal Dictionary. Automation tools are provided so users can quickly and efficiently determine the

relevancy of documents based on the defined items of interest. Interactive visual displays are provided that model the contents of documents according to items of interest, so that the users can efficiently and quickly scan large volumes of information to determine their relevancy.

During the Analysis phase data is analyzed, compared, related, visualized, and understood in terms of the items of interest. Relationships between data items are recorded and automatically maintained. Knowledge is added to the data items in terms of written comments and relationships between items.

Relationship diagrams are provided that graphically depict relationships between any two items of interest. The relationship diagrams display relationships according to degrees of separation. Users are instantly presented with direct and distant relationships between items of interest. During the Dissemination phase users create reports that are automatically sent to other users. Documents and other data files are bookmarked during the Analysis phase so that they are instantly retrievable during the Dissemination phase and included in the final report.

US Patent 6,675,159 to Lin et al for <u>Concept-Based Search And Retrieval System</u> describes a concept-based indexing and search system indexes collections of documents with ontology-based predicate structures through automated and/or human-assisted methods. Lin et al. disclose that the system extracts the concepts behind user queries to return only those documents that match those concepts. The concept based search and retrieval system comprehends the intent behind a query from a user, and returns results matching that intent. The system can perform off-line searches for unanswered user queries and notify the user when a match is found.

<div align="center"><u>**Applicants' Claimed Invention**</u></div>

<u>Status of the Claims.</u>

Claims 1-19 were originally presented for Examination. All of the claims were rejected in the Office Action of March 9, 2006. Applicants have canceled claim 13, amended claim 5

<div align="center">10</div>

to make it dependent on claim 1, and extensively amended claims 1, 5, 6, 7, 8, 9, 10, 14, and 17.

The amendments add the disclosure of paragraph [0034]⁴ to the amended claims. This is to give claim expression to the teaching of *"In "ontology", relationships among metadata are described, and predicate relationships of the class hierarchy are described using the RDF schema. For example, as concepts (classes) and properties, a parent-child relationship is shown by "subClassOf", and an inverse relationship is shown by "inverseOf".*

Exemplary Claim

Claim 1, as amended, is exemplary.

1.   (Presently Amended) An information search support system comprising:

ontology extracting means for, based on a service selection command from a browser, extracting an ontology, said ontology displaying relationships among metadata and predicate relationships as concepts and properties, vocabularies, and parent-child relationships, said ontology corresponding to a selected service;

storing means for analyzing the ontology extracted by said ontology extracting means and storing into a memory a conceptual

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⁴ [0034] Here, "ontology" is one of methods for expressing semantic information and is a set of sentences that define relationships among concepts and logical rules for interpreting them. For example, it is assumed that a content of "Sunday, the morning, Yamato, internal department" is searched. In the Web of the present state, the words are taken out as they are from HTML and outputted as a search result so that a lot of search garbage has been generated. On the other hand, in the method using "ontology", logical rules are defined for interpreting (a) Yamato is a name of the city, (b) A hospital includes the internal department, the department of surgery and the department of otolaryngology, (c) There are consultation days and hours in a hospital, and the like, and a search result can be obtained from a set of those sentences. For example, semantics are given on a Web site as metadata in the Semantic Web, wherein RDF (Resource Description Framework) can be used with respect to the structure of metadata, and the RDF schema can be used as to how to give metadata. In "ontology", relationships among metadata are described, and predicate relationships of the class hierarchy are described using the RDF schema. For example, as concepts (classes) and properties, a parent-child relationship is shown by "subClassOf", and an inverse relationship is shown by "inverseOf". If the ontology is used on the Semantic Web, a further intellectual search is made possible.

11

structure and details of properties corresponding to respective concepts, including the relationships among
metadata and predicate relationships as concepts and properties, and parent-child relationships;

concept window display means for calling said conceptual structure, including the relationships among metadata and predicate relationships as concepts and properties, and parent-child relationships stored in said storing means and displaying it in a display area of said browser;

inference engine means for extending/compressing vocabularies relative to the concepts selected from said concepts;

and property window display means for calling from said storing means details of a property corresponding to a concept selected from said conceptual structure displayed by said concept window display means and displaying them in a display area of said browser.

Discussion: Art Rejection

The overarching issue is whether the claims, as lim-ited by the newly added clauses and limitations are allowable over the art of record.

Claim 1 will be analyzed in detail. The claim was the only claim rejected under 35 USC §102, and as a result of the present amendments, the limitations of claim 1 are carried into the other claims.

Analysis of Claim 1, Claims Dependent On Claim 1, And Claims Parallel to Claim 1

Analyzing claim 1, element by element:

An information search support system comprising:

Preamble – which does not impart patentability.

> **ontology extracting means for, based on a service**
> **selection command from a browser, extracting an**
> **ontology, said ontology displaying relationships among**
> **metadata and predicate relationships as concepts and**
> **properties, vocabularies, and parent-child relationships,**
> **said ontology corresponding to a selected service;**

The limitation "said ontology displaying relationships among metadata and predicate relationships as concepts and properties, vocabularies, and parent-child relationships, said ontology" was added by amendment, and the specific recitation of ontology characteristics is not specifically disclosed in the references.

The original limitation of "ontology extracting means for, based on a service selection command from a browser, extracting an ontology ... corresponding to a selected service" was said to be taught by Paik, column12, lines 30-35, *"Concept Identifier 165 scans text from left to right to determine the boundaries between unique concepts. It searches for the longest phrase possible. Phrases are defined as one or more non-predicating adjectives or nouns preceding a noun. Each identified phrase becomes a candidate for a concept."* and the code in Column 29, which the Office Action says that these passages show that the concept definition uses an ontology.

> **storing means for analyzing the ontology extracted by**
> **said ontology extracting means and storing into a**
> **memory a conceptual structure and details of properties**
> **corresponding to respective concepts, including the**
> **relationships among metadata and predicate**
> **relationships as concepts and properties, and parent-**
> **child relationships;**

The limitation "including the relationships among metadata and predicate relationships as concepts and properties, and parent-child relationships;" was added by amendment, and the specific location of what is extracted and stored is not particularly disclosed in the cited references.

The original limitation "storing means for analyzing the ontology extracted by said ontology extracting means and storing into a memory a conceptual structure and details of properties corresponding to respective concepts," was said in the Office Action to be taught by Paik, column 12, line 65, to column 13, line 4, *"Conceptual Hierarchy database 117 maps related words and terms (synonyms) into a single concept cluster. The database differentiates between phrases as concept units and single term concepts. The concepts are organized as a hierarchical*

set of relations in the database. The Conceptual Hierarchy database is constructed from raw text sources, and augmented by such existing products such as WORDNET (Miller, 1995) or other thesauri."

> **concept window display means for calling said conceptual structure, including the relationships among metadata and predicate relationships as concepts and properties, and parent-child relationships stored in said storing means and displaying it in a display area of said browser;**

The limitation "including the relationships among metadata and predicate relationships as concepts and properties, and parent-child relationships" was added by amendment, and the idea of specifically calling and displaying the relationships among metadata and predicate relationships as concepts and properties, and parent-child relationships is not specifically taught by the references.

The Office Action applies Figure 7 ("Expansion/Clarification") to this limitation. The Paik specification characterizes Figure 7 as:

> "FIG. 7 is a representation of the sense disambiguation screen displayed during query processing. Note that this screen shot is intended as an example and in no way limits the screen design or functionality to this particular interface design."

A "sense disambiguation screen"?

> **inference engine means for extending/compressing vocabularies relative to the concepts selected from said concepts;**

The limitation of "inference engine means for extending/compressing vocabularies relative to the concepts selected from said concepts;" was added by amendment and is not specifically taught by the references. Basis therefore is in numbered paragraph [0047][5]

> **and property window display means for calling from said storing means details of a property corresponding to a concept selected from**

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[5] [0047] The inference processing mechanism 42 uses the inference engine 63 to extend/parse various vocabulary information, thereby serving to induce a search request from the user terminal 11 to more accurate one. Here, the inference processing is implemented using axiom rules being a rule group described in a rule describing format accepted by the inference engine 63. In this inference processing, the inference engine 63 is used for carrying out semantic executing of an ontology. In the inference engine 63, under the control of the inference engine execution control mechanism 64, a syllogism, for example, is carried out only from facts, wherein, for inferring from facts (metainformation described in ontology language) scattered on the Web, a categorical syllogism, for example, is carried out. As this categorical syllogism, there can be cited, for example, ...

14

said conceptual structure displayed by said concept window display means and displaying them in a display area of said browser.

The Office Action cites FIG. 7 ("Word Senses") as the anticipatory prior art.

Claims 2 Through 9
(Dependent On Claim 1)

Claims 2 through 9 are dependent on Claim 1, discussed above, and each one carries all of the limitations of claim 1.

Claim 2

An information search support system according to claim 1, wherein the conceptual structure stored in said storing means is a conceptual tree structure taking a parent-child relationship into account.

Claim 2 has been rejected as unpatentable over Paik in view of Lin. Lin was cited for its teaching of a "conceptual tree", that is, the disclosure at column 8, line56, to column 9, line 2[6] and Column 9, line 66 to Column 10, line 4,[7] where Lin's tree structures are described as , being "...based on the syntactic tags attached to the concepts," where "the tree structures are created through the use of a context-free grammar."

By way of contrast, Applicants claim that the tree is derived from "relationships among metadata and predicate relationships as concepts and properties, and parent-child

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[6] The present system and method for concept-based searching is distinguishable from an ontology-based search system. A purely ontology-based search system would expand queries from particular words to include synonyms, instances, and parent concepts (e.g. submarine is a synonym with U-boat, IBM is an instance of a company, and vehicle is a parent concept of automobile). However, such an ontology-based search system would only search for documents containing other words that are defined by the ontology to be related to the query. On the other hand, a method and system for concept-based searching according to the present invention has the capabilities of an ontology-based search system plus it can search for logically structured groupings of items from the ontology. (emphasis added)

[7] The parser 124 creates syntactic tree structures that represent the grammatical relations between the ontological concepts, based on the syntactic tags attached to the concepts. The tree structures are created through the use of a context-free grammar, and may be implemented through a variety of techniques. (Emphasis added)

15

relationships" and (contrary to Lin's teaching) "inference engine means for extending/compressing vocabularies relative to the concepts selected from said concepts." This is clearly not Lin's "conceptual tree" "based on the syntactic tags attached to the concepts," where "the tree structures are created through the use of a context-free grammar."

Claims 3 through 19

Claims 3 through 9 are dependent on Claim 1 and contain all of the limitations of claim 1. Claims 3 through 9 have been rejected under 35 USC 103 over Paik in view of Kisiel. Specifically, the general statement in the Background at Column 1, lines 34-41[8] was cited against claims 3 and 7, and Column 11, lines 10 to 19[9] was applied against claims 3, 5, 10, and 15 relating to the browser and display area. However, as noted above, these are dependent claims (Claims 3, 5), claims that now parallel claim 1 (Claim 10), or claims that are dependent on claims parallel claim 1 (Claim 15).

Claims 5 and 6

Claims 5 and 6 were rejected over a three reference combination of Paik, Lin, and Kisiel. Claim 5 has been amended and made dependent on Claim 1 discussed above. Claim 6 is dependent on Claim 5 which is now dependent on claim 1. Claim 1 has been discussed above.

Conclusion

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[8] Additionally, using the conventional method, the analyst is required to have a thorough understanding of Boolean logic and a database query language, such as Standard Query Language (SQL), to gain access to the stored data. It has been estimated that using these conventional methods, analysts can spend up to ninety percent of their time searching, collecting, and organizing information.

[9] This action causes a Relationship window 2100 to be displayed, as shown in FIG. 21 This relationship window 2100 allows the user to record information about the relationship. In this example the relationship between "COFFEE" and "CAPTAIN COOK" 2110 is created. In the Relationship window 2100, the strength of the relationship 2102 and the type of relationship 2104 is recorded. In this example, the user entered the keyword "DISCOVERED" 1204 to describe the relationship between "COFFEE" and "CAPTAIN COOK".

Based on the above discussion, it is respectfully submitted that the pending claims describe an invention that is statutory subject matter and is properly allowable to the Applicants.

If any issues remain unresolved despite the present amendment, the Examiner is requested to telephone Applicants' Attorney at the telephone number shown below to arrange for a telephonic interview before issuing another Office Action.

Applicants would like to take this opportunity to thank the Examiner for a thorough and competent examination and for courtesies extended to Applicants' Attorney.

Respectfully Submitted

Richard M. Goldman, Reg. # 25,585
371 Elan Village Lane, Suite 208
San Jose, CA 95134
Voice: 408-324-0716
Fax: 408-324-0672
E-mail: goldmanptn@aol.com